

**Comparison of a changing process on a single Job Lot of 16 pieces. Work time = 24 minutes.**

Job Lot:	5" x 8.25" Bar CNC Lathe Turned	Reduction
46.5	pounds started per piece	
24.0	minutes	
9.1	pounds finished	

Job Lot:	Near-Net (5" Round + 1.75" Dia Shaft)	
9.1	pounds started per piece	80.4% 37.4 pound Stainless Steel reduction
1.5	minutes	93.8% 22.5 minutes saved
9.1	pounds finished	

1	truckload of incoming Raw Stock	
20	tons (40,000 pounds)	
275	Near-Net (5" Round + 1.75" Dia Shaft) Job Lots	80.4% fewer truckloads, railcars,
54	5" x 8.25" Bar Job Lots of stock	and raw material production

National Projection for this one Job Lot		16 pieces
1,000	Job Lots nationally (any given time period)	
372	tons of Stainless Steel	299 scrap tons
19	5" x 8.25" Bar Truckloads	80% of material wasted
15	Truckloads of Scrap	
6,400	Hours Time	6,000 Hours wasted
5,313	Total Tons raw materials transported to make Stainless Steel and generate electricity	

Tons of Carbon Dioxide Emitted on 5" x 8.25" Bar Job Lots from:	Tonnage Carbon Dioxide Emission Reduction
5,354 Stainless Steel production from mining to mill	4,306
12 Trucking of stock materials and processed goods	9
160 Electric Power Generation for Job Lot work	80
0.191 Trucking of scrap to recycle	0.191 (No scrap with FrW)
1,722 Electric Power Generation for Recycling scrap	1,722
7,248 total tons CO2	6,117 84.4%

kWh consumed	
5,354,088	Total Embodied Energy of Stainless Steel Used
160,000	Turn Full Bar 80,000 Friction Weld Near-Net (5" Round + 1.75" Dia Shaft)
1,722,249	Recycle scrap Stainless Steel chips
7,236,336	total kWh consumed

= tons of coal burnt per kWh conversion  
 3,908  
 per CO2 conversion  
 3,876

per ton Stainless Steel smelted	Amounts consumed in this example		
	Full Bar	FrW	saved
2 Tons Ore	744	146	598
1 Tons Coal	372	73	299
0.50 Tons Limestone	186	36	149
0.11 Tons Nickel	41	8	33
0.17 Tons Chromium	63	12	51
	1,405	275	1,130

- 0.00054 Tons Coal burnt per kWh
- 6 miles per gallon of diesel trucking
- 326 gallons per ton of Carbon Dioxide
- 600 miles from mill to Service Center
- 25 miles from Service Center to Machining
- 600 miles from Machining to Assembly
- 25 miles from Machining to Scrap Recycler
- ((# trucks x miles)/mileage)/CO2 factor

14,402 kWh / Ton embodied energy in Stainless Steel  
 Includes mining and shipping all raw materials, manufacture of Stainless Steel at mills, rolling into bar for distribution.

5,761 kWh / Ton to recycle Stainless Steel 60% less than virgin steel

- 10 kWh CNC lathe turning per Job Lot
- 5 kWh friction weld operation per Job Lot

0.001 Tons CO2 per kWh  
 1.87 Tons CO2 per ton of coal

5.5 Quadrillion tons of air in atmosphere